PCT/US00/06327

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 02 November 2000 (02.11.00)	
International application No. PCT/US00/06327	**Applicant's or agent's file reference** BKD 179 P2-P
International filing date (day/month/year) 14 March 2000 (14.03.00)	**Priority date** (day/month/year) 16 March 1999 (16.03.99)
Applicant SMITH, R., Duane	

1. The designated Office is hereby notified of its election made:

   [X] in the demand filed with the International Preliminary Examining Authority on:

   11 September 2000 (11.09.00)

   [ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

   [ ] was not

   made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Nestor Santesso
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

Spec!

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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B65H 18/20, 19/26, 19/28, 19/29

A1

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(71) Applicant *(for all designated States except US)*: BLACK CLAWSON COMPANY, INC. [US/US]; 46 N. First Street, Fulton, NY 13069 (US).

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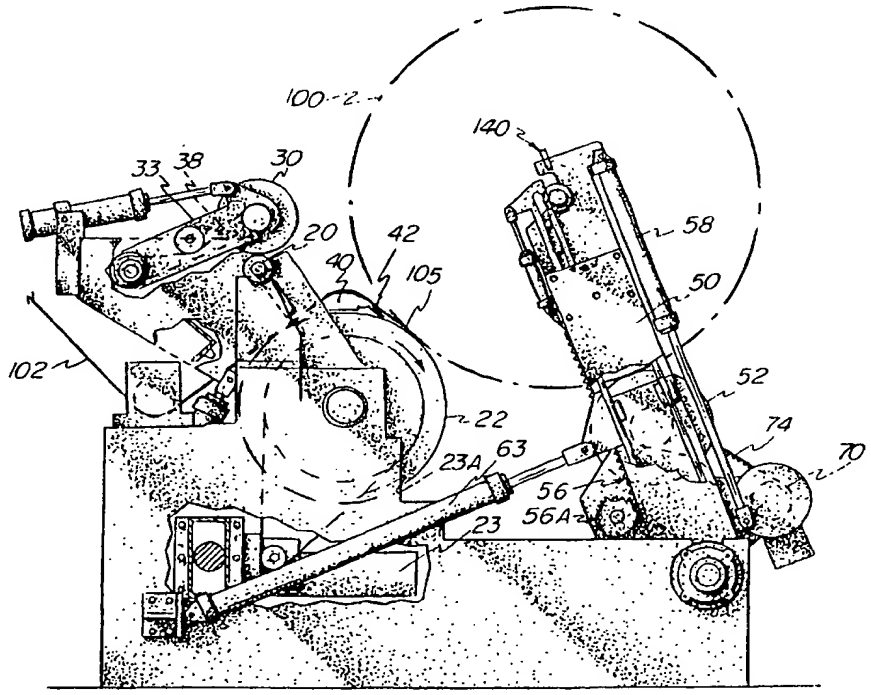
Published
With international search report.

(54) Title: CONTINUOUS WINDER AND METHOD OF WINDING SLIT ROLLS OF LARGE DIAMETER ON SMALL DIAMETER CORES

(57) Abstract

A drum type continuous winder for winding slit sections of a web onto individual cores on a core shaft (20) includes a pair of primary support arms (24, 25) having radial slots (28) that receives the core shaft from a fixed cam plate (29) permitting the core shaft to move with the cores into engagement with a moving web on a main winding drum (22) for web cutting and transfer to fresh cores. A driven nip roll (30) supported on arms (24, 25) engages the cores on the core shaft during web transfer so that the core shaft is sandwiched between the nip roll (30) and the primary drum (22) providing web transfer onto the cores free of critical speed limitations. Secondary arms (50, 51) which receive the core shaft support a secondary winding drum (52) in guide tracks (55) for radial movement into engagement with the rolls being wound.



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PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
BRUCE E. PEACOCK
BIEBEL & FRENCH
35 EAST FIRST STREET
DAYTON, OH 45402

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing *(day/month/year)*	10 AUG 2001

Applicant's or agent's file reference	IMPORTANT NOTIFICATION
BKD 179 P2-P	

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US00/06327	14 March 2000 (14.03.2000)	16 March 1999 (16.03.1999)

Applicant

BLACK CLAWSON COMPANY, INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	John M. Jillions
Facsimile No. (703)305-3230	Telephone No. (703) 308-2685

Form PCT/IPEA/416 (July 1992)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BKD 179 P2-P	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US00/06327	International filing date *(day/month/year)* 14 March 2000 (14.03.2000)	Priority date *(day/month/year)* 16 March 1999 (16.03.1999)
International Patent Classification (IPC) or national classification and IPC IPC(7): B65H 18/20, 19/26, 19/28, 19/29 and US Cl.: 242/527.2, 530.1, 532.3, 541.6, 542.2, 542.3		
Applicant BLACK CLAWSON COMPANY, INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
11 September 2000 (11.09.2000)	12 June 2001 (12.06.2001)
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer John M. Jillions Telephone No. (703) 308-2685

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIM[illegible]RY EXAMINATION REPORT

International application No.
PCT/US[illegible]6327

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed.

☒ the description:
pages 1-8, 10-12, 14, 16 as originally filed
pages NONE, filed with the demand
pages 9,13,15,17 and 18, filed with the letter of 12 March 2001 (12.03.2001)

☒ the claims:
pages 21-23, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages 19 and 20, filed with the letter of 12 March 2001 (12.03.2001)

☒ the drawings:
pages 1-9, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination(under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages NONE

☐ the claims, Nos. NONE

☐ the drawings, sheets/~~fig~~ NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

*** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US[redacted]6327

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims	4-18	YES
	Claims	1-3	NO
Inventive Step (IS)	Claims	4-8, 10-18	YES
	Claims	1-3, 9	NO
Industrial Applicability (IA)	Claims	1-18	YES
	Claims	NONE	NO

2. CITATIONS AND EXPLANATIONS (Rule 70.7)

Claims 1-3 lack novelty under PCT Article 33(2) as being anticipated by Egan. Egan discloses a method of winding split webs onto individual cores carried on a common shaft I including transfer of the split webs substantially at line speed from fully wound rolls onto new cores on the mandrel or shaft I, and comprises (a) placing the core shaft into surface contact with the split webs supported on the winding drum 1, the core shaft and cores thereon being brought up to line speed by the driven nip roll 3 prior to contact of the cores with the split webs, see col. 5, lines 15-22; (b) applying the driven nip roll 3 to the cores while constricting the ends of the core shaft against movement, see Fig. 10, and restraining members 42, 48, 56; (c) severing the split webs downstream of the region of contact of the cores with the webs and simultaneously transferring the webs onto the new cores, see the knife L and blowers 128, 130 in Fig. 10; and (d) continuing to wind the webs while the core shaft is constrained, see Fig. 11, and even after the rolls are transferred to the winding nip between support drums 1, 2 by the constraining jaws 92, 93 of arms N, col. 8, lines 50-55. With respect to claim 3 note the elongated slot 54 on member 42 which, in Fig. 10, extends radially of the drum 1, and which functions to restrain the core shaft and guide the core shaft with loaded cores along a path into contact with the split webs on drum 1. Since the core shaft I of Egan is supported at all times during the winding operation by the members 42, 48, 56, 92, 93 and by the support drums 1 and 2 and nip roll 3, then the core shaft is prevented from deflection during the winding operation.

Claim 9 lacks an inventive step under PCT Article 33(3) as being obvious over Egan in view of Ikeda. It would have been fairly obvious to spray an adhesive on the inside surface of the webs immediately prior to the cutting step in the device of Egan in view of the teaching of Ikeda, note spraying device 18, to ensure proper initial winding of the webs onto the new cores.

Claims 4-8, 10-18 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest in a method of winding as set forth in claim 1, the further provision as recited in claim 4 of a movable secondary support drum which is brought into contact with the rolls when the rolls have attained a predetermined diameter while maintaining contact of the driven nip roll with the building rolls; or the further provision as set forth in claim 7 that the nip roll is driven at a speed mode prior to the cutting step and is switched to an adjustable torque mode following the transfer of the webs onto the cores of the core shaft; or in an apparatus as set forth in claim 13 the provision of radially extending slots in arms carrying the lay-on roll, through which slots the ends of the core shaft extend to allow the cores to engage the web carried on the surface of the winding drum while the cores are simultaneously engaged by the lay-on roll..

The primary arms 24 and 25 in turn support a driven primary arm nip roll 30. The nip roll 30 is supported on nip roll support arms 33 that are pivoted at 35 on the primary arms 24. The pivot 35 incorporates a shaft angle encoder so that the diameter of a building roll on the drum 22 may be determined. The primary nip roll is covered with silicone rubber or is plasma release coated. The positions of the arms 33 and the supported primary nip roll 30 are controlled by actuators or cylinders 36, one on each side of the winder. The cylinders 36 can move the nip roll 30 from an elevated position, as shown in Figs. 2 and 3, to a fully lowered position in engagement with cores on the core shaft 20 as shown for example in Figs 1 and 6. The roll 30 is driven by a drive motor 37 and belt 38.

Also, as best shown in Fig. 3 and 5, a web transfer and cut-off shoe 40 extends transversely adjacent the outer surface of the drum 22 between the frames 13 and 14 and rotates about the axis in common with the axis of the drum 22. The shoe 40 is movable on its support arms 41 between a lowered or retracted position, as shown in Fig. 3 to a rotated operative position, as shown in Figs. 1, 4 and 5, and carries with it a web cut off knife 42 which may be extended above the shoe and into the path of the webs passing over the drum 22 for severing the webs.

The shoe 40 provides an upper curved surface that is designed to be operated with the web running over the surface. The arms 41 supporting the shoes are connected by a common shaft to a drive motor 39, Fig. 1 by which the shoe 40 may be positioned between its lowered inoperative position, as shown in outline form in Fig. 3 to its elevated operative position, including the cut off knife as shown in Figs. 4 and 5.

A spray bar 44 is fixably mounted on a cross member 45 and supports a plurality of adjustably positionable adhesives spray nozzles 46. The spray nozzles are connected to a source of adhesive and may be aligned so that primarily only the web segments are sprayed by adhesive for transfer to a new core.

A pair of support arms 50, 51, referred to herein as secondary arms, are pivotally mounted at the off running ends of the side frames 13 and 14. An encoder 50A is incorporated into the pivot support to read out the angular position of the support arms.

The secondary arms 50 and 51 have a number of functions. First, they

the secondary arm 50, 51 to pivot to the primary/secondary transfer position as diagrammatically illustrated at 110 in the position shown in Fig. 7. The core shaft may be pulled and recored, and a recored shaft may be returned for readiness to be placed in the primary arms 24 in the slot 28 and on the cams 29, according to core handling apparatus well known in the art.

Also, following regenerative braking by the support drum 52, where a percentage of support drum pressure may be added to the support drum to prevent slippage during braking, and preceding the off loading of the completed roll set 100, the carriage sub-assembly for the secondary support drum 52 is fully lowered to its lowered position, by relative movement of the plates 50, 51 on the tracks 55 of the secondary arms. This fully lowered position is illustrated in Fig. 7.

During the continued winding of the roll set 100A, the primary arms 24, 25 continue to rotate and slowly move the winding set to the +30° from the vertical position as defined. After the primary arms are in the 30° position, substantially as shown in Figs. 7 and 8, and the winding roll 100A reaches a specific diameter of say 18", the secondary or support arms are moved slowly back toward the primary drum 22 and are stopped by a proximity switch 120 on the ends of the arms, at the notch 80. During this time the secondary support drum 52 is brought into raised position in a speed mode. The proximity switch 120 indicates that the core shaft 20 is now in the notch, and the position substantially is shown in Fig. 8. At that time, the latch plate 84 is activated by the cylinders 80 to lock and secure the core shaft in the notch 80 of the secondary arms. The winding now progresses, as shown in Fig. 8, in which the building roll set is wound into the secondary drum while engagement by the nip roll 30 is maintained. The up position of the support drum, at 52, reduces the lift pressure in cylinders 59 to a counter balancing pressure applied by the cylinders 59 to the effect that the loading on the roll 100A is zero or negligible so the primary nip roll 20 loading is dominate.

In a preferred embodiment, in which 60 inch diameter rolls 100 are formed, the initial engagement of the secondary arms as described above and as illustrated in Fig. 8 may take place at about a minimum 18 inch diameter and winding then continues by continuing to drive the secondary drum 52 in the speed

secondary arms, in the slots 80, is accomplished by receiving the core shaft in the slots 80 at the outer support surfaces 20b.

The hand-off of the building rolls 100A from the primary to the secondary arms, accomplished in views 7 and 8, occurs at a time when the building rolls have achieved a sufficient diameter so that the core shaft may be released from the slot 28. This is a function of the design of the machine but typically may be a diameter of 18 inches or greater. The secondary arms 50, 51, following the off-loading of the first roll set 100, are moved into a receiving position as shown in Figs. 7 & 8 and the transfer is smoothly made by engaging the core shaft at the adjacent support surface 20b stopping secondary arms 50, 51 rotations by sensor 120, and closing the slots 80 with the cylinders 82 and slot retainers 84, that move in non-interfering and adjacent relation to the primary arms with counter balance pressure programming as a function of secondary arms 51, 52 position by sensor 50A provided to cylinders 63, 64.

Sequence of Operations

1. While winding set is between driven main winding drum 22 and driven support drum 52 and with driven primary arm nip roll 30 retracted, a new freshly cored shaft 20 is automatically loaded onto cams 32 around slot 28 in primary arms in the -30° from vertical centerline position.

2. Upon initiation of roll change sequence, the knife shoe 40 is indexed around drum, under web and stops in cut position on the other side of core.

3. The driven primary arm nip roll 30 lowers to cored shaft and goes into speed mode to speed up the new cores close to line speed. See Figure 4.

4. Spray adhesive applicator nozzles 46 are in close proximity to the respective web 102.

5. Primary arms 25, 25 move 5° to -25° position from vertical centerline and core shaft 20 lowers off cams 28 and onto web 102 and drum 22, straightening the natural deflection.

6. As primary arms moves to -20° position, adhesive sprays onto web and pastes down the tails on the slit wound rolls 100. See Figure 5.

toward the drum 22 and are stopped when a proximity switch 140 on the arm 50 senses it is close to the new winding shaft. See Figure 8. Switch 140 is shown in Figure 4.

19. The support arm latch 84 extends and closes an interlock which allows the support arm retraction under counterbalance pressure.

20. The support drum 50 raises as the support arms pivot toward the drum 22 in the speed mode under raise pressure and switches to balance pressure at, say, 24" diameter and the winding set winds into the balanced support drum.

21. As the rolls wind, a position sensor 50A on support arm's pivot is used to program the counterbalance pressure of the support arm by the cylinders 58, 59 to prevent excessive bending of the core shaft during the winding operation.

22. When the winding set reaches a 24" to 30" diameter, the driven primary arm nip roll 30 raises and the support drum 52 changes from balance to programmed support pressure and the drive changes from speed to SLAT mode.

23. After the primary arm nip roll 30 has fully raised and the drive stopped, the primary arms 24, 25 rotate back to the load position. See Figure 9.

24. The nip of the programmed support pressure is adjusted to control roll hardness. The proximity switch 130 on the support arm senses if the support drum is supplying excessive support pressure and lifting the winding set. If this switch senses the core shaft, the support drum pressure is slowly decreased until the rolls and core shaft lower away from the switch.

25. After step 15, a shaft puller automatically engages with the core shaft and bleeds out the inflation pressure.

26. The shaft 20 is then retracted from the wound set 100 by an automatic shaft puller.

27. The table 110 lowers the rolls to the roll platform (not shown) and tilts to eject the rolls on the platform.

28. New cut cores are either manually or automatically loaded onto the table.

29. After the table senses that new cores have been loaded, the

table raises to the shaft insertion position.

30. The shafts are automatically inserted and automatically inflated.

31. An overhead hoist then picks up the shaft and when the primary arms have rotated back to the load position, the shaft is automatically loaded back onto the cam 32 around the slot 28 in the primary arms.

32. The winder is now ready for the next automatic roll change after the programmed footage or diameter on he winding roll is reached.

While the method herein described, and the form of apparatus for carrying this method into effect, constitute preferred embodiments of this invention, it is to be understood that the invention is not limited to this precise method and form of apparatus, and that changes may be made in either without departing from the scope of the invention, which is defined in the appended claims.

What is claimed is:

--CLAIMS--

1. The method of continuously winding split webs onto individual cores carried on a common elongated shaft into a corresponding plurality of large diameter rolls including transfer of the split webs, substantially at line speed, from fully wound rolls onto such cores, comprising the steps of:

(a) placing the core shaft with cores thereon into surface contact with such split webs supported on a winding drum and bringing said core shaft and cores thereon up to line speed.

(b) applying a driven nip roll to said cores substantially at line speed while simultaneously constricting the ends of said core shaft against movement lateral to a radius line from the axis of rotation of said drum through said core shaft and,

(c) while said core shaft is so restrained, severing the split webs at positions downstream of the region of contact of said cores with said webs by said drum and simultaneously transfering said webs onto corresponding cores on said core shaft.

(d) and continuing to wind said webs onto said cores while said core shaft is so constrained laterally and constrained by said driven nip roll against core shaft deflections that would otherwise cause critical speed limitations.

2. The method according to claim 1 in which core shaft and the cores thereon are brought substantially to web line speed by the driven nip roll prior to contact of the cores with the split webs on the winding drum.

3. The method according to claim 1 in which said restraining step includes securing the core shaft at its ends against lateral movement by capturing the ends of the core shaft in an elongated slot that extends in a direction generally radially of the drum and provides a pathway for the core shaft with loaded cores thereon to be moved into contact with split rolls on said drum.

4. The method according to claim 1 in which the winder has a movable secondary support drum that is movable into contact with rolls building on the cores and in spaced relation to the winding drum, further including the step of bringing the secondary drum into contact with such rolls when the rolls have attained a predetermined diameter while maintaining contact of said driven nip roll with said building rolls.

5. The method according to claim 4 in which the step of restraining said core shaft against lateral movement is terminated following engagement of the secondary drum with the building rolls.

6. The method according to claim 4 in which the nip roll is maintained in contact with the building rolls at least until the secondary drum has come into contact with the building rolls.

7. The method according to claim 1 in which the nip roll is driven at a speed mode prior to the cutting step and is switched to a speed limited adjustable torque mode following the transfer of the webs onto the cores of the core shaft.

8. The method according to claim 6 in which the pressure of the nip roll on the building rolls is increased with increasing diameters of the rolls.

9. The method according to claim 1 including the step of spraying an adhesive on the inside surface of the webs leading to the fully wound rolls immediately prior to said cutting step for simultaneously gluing the tail segments of

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/06327

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) :B65H 18/20, 19/26, 19/28, 19/29
US CL :242/527.2, 530.1, 532.3, 541.6, 542.2, 542.3
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 242/527.2, 530.1, 532.3, 541.5, 541.6, 541.7, 542.2, 542.3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	Y US 3,066,883 A (EGAN) 04 December 1962 (04/12/62), Figs. 11-12, col. 4, lines 13-18.	1-3 7, 9
X --- Y	US 3,258,217 A (MACARTHUR et al) 28 June 1966 (28/06/66), Figs. 1, 9-11, col. 5, lines 3-11.	1-3 7, 9
Y	US 3,009,666 A (MOSER) 21 November 1961 (21/11/61), col. 5, lines 25-35 and Fig. 1.	7
Y	US 4,572,451 A (IKEDA et al) 25 February 1986 (25/02/86), see col. 2, lines 53-57, col. 3, lines 25-29.	9
A	US 2,579,199 A (MARCALUS) 18 December 1951 (18/12/51), see whole document.	1-18

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 27 APRIL 2000	Date of mailing of the international search report 16 MAY 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer JOHN M. JILLIONS Telephone No. 703-308-2685

Form PCT/ISA/210 (second sheet) (July 1998)★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/06327

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2,915,255 A (PHELPS) 01 December 1959 (01/12/59), see whole document.	1-18
A	US 3,794,255 A (HARMON et al) 26 February 1974 (26/02/74), see whole document.	1-18
A	US 5,690,298 A (RUCK) 25 November 1997 (25/11/97), see col. 3, lines 15-18.	1-18

09/914,577

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

5

Applicant's or agent's file reference BKD 179 P2-P	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US00/06327	International filing date *(day/month/year)* 14 March 2000 (14.03.2000)	Priority date *(day/month/year)* 16 March 1999 (16.03.1999)
International Patent Classification (IPC) or national classification and IPC IPC(7): B65H 18/20, 19/26, 19/28, 19/29 and US Cl.: 242/527.2, 530.1, 532.3, 541.6, 542.2, 542.3		
Applicant BLACK CLAWSON COMPANY, INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
11 September 2000 (11.09.2000)	12 June 2001 (12.06.2001)
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer John M. Jillions Telephone No. (703) 308-2685

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US00/06327

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed.

☒ the description:
pages 1-8; 10-12, 14, 16 as originally filed
pages NONE, filed with the demand
pages 9,13,15,17 and 18, filed with the letter of 12 March 2001 (12.03.2001)

☒ the claims:
pages 21-23, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages 19 and 20, filed with the letter of 12 March 2001 (12.03.2001)

☒ the drawings:
pages 1-9, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination(under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages NONE

☐ the claims, Nos. NONE

☐ the drawings, sheets/~~fig~~ NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

*** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US00/06327

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims	4-18	YES
	Claims	1-3	NO
Inventive Step (IS)	Claims	4-8, 10-18	YES
	Claims	1-3, 9	NO
Industrial Applicability (IA)	Claims	1-18	YES
	Claims	NONE	NO

2. CITATIONS AND EXPLANATIONS (Rule 70.7)

Claims 1-3 lack novelty under PCT Article 33(2) as being anticipated by Egan. Egan discloses a method of winding split webs onto individual cores carried on a common shaft I including transfer of the split webs substantially at line speed from fully wound rolls onto new cores on the mandrel or shaft I, and comprises (a) placing the core shaft into surface contact with the split webs supported on the winding drum 1, the core shaft and cores thereon being brought up to line speed by the driven nip roll 3 prior to contact of the cores with the split webs, see col. 5, lines 15-22; (b) applying the driven nip roll 3 to the cores while constricting the ends of the core shaft against movement, see Fig. 10, and restraining members 42, 48, 56; (c) severing the split webs downstream of the region of contact of the cores with the webs and simultaneously transferring the webs onto the new cores, see the knife L and blowers 128, 130 in Fig. 10; and (d) continuing to wind the webs while the core shaft is constrained, see Fig. 11, and even after the rolls are transferred to the winding nip between support drums 1, 2 by the constraining jaws 92, 93 of arms N, col. 8, lines 50-55. With respect to claim 3 note the elongated slot 54 on member 42 which, in Fig. 10, extends radially of the drum 1, and which functions to restrain the core shaft and guide the core shaft with loaded cores along a path into contact with the split webs on drum 1. Since the core shaft I of Egan is supported at all times during the winding operation by the members 42, 48, 56, 92, 93 and by the support drums 1 and 2 and nip roll 3, then the core shaft is prevented from deflection during the winding operation.

Claim 9 lacks an inventive step under PCT Article 33(3) as being obvious over Egan in view of Ikeda. It would have been fairly obvious to spray an adhesive on the inside surface of the webs immediately prior to the cutting step in the device of Egan in view of the teaching of Ikeda, note spraying device 18, to ensure proper initial winding of the webs onto the new cores.

Claims 4-8, 10-18 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest in a method of winding as set forth in claim 1, the further provision as recited in claim 4 of a movable secondary support drum which is brought into contact with the rolls when the rolls have attained a predetermined diameter while maintaining contact of the driven nip roll with the building rolls; or the further provision as set forth in claim 7 that the nip roll is driven at a speed mode prior to the cutting step and is switched to an adjustable torque mode following the transfer of the webs onto the cores of the core shaft; or in an apparatus as set forth in claim 13 the provision of radially extending slots in arms carrying the lay-on roll, through which slots the ends of the core shaft extend to allow the cores to engage the web carried on the surface of the winding drum while the cores are simultaneously engaged by the lay-on roll..

The primary arms 24 and 25 in turn support a driven primary arm nip roll 30. The nip roll 30 is supported on nip roll support arms 33 that are pivoted at 35 on the primary arms 24. The pivot 35 incorporates a shaft angle encoder so that the diameter of a building roll on the drum 22 may be determined. The primary nip roll is covered with silicone rubber or is plasma release coated. The positions of the arms 33 and the supported primary nip roll 30 are controlled by actuators or cylinders 36, one on each side of the winder. The cylinders 36 can move the nip roll 30 from an elevated position, as shown in Figs. 2 and 3, to a fully lowered position in engagement with cores on the core shaft 20 as shown for example in Figs 1 and 6. The roll 30 is driven by a drive motor 37 and belt 38.

Also, as best shown in Fig. 3 and 5, a web transfer and cut-off shoe 40 extends transversely adjacent the outer surface of the drum 22 between the frames 13 and 14 and rotates about the axis in common with the axis of the drum 22. The shoe 40 is movable on its support arms 41 between a lowered or retracted position, as shown in Fig. 3 to a rotated operative position, as shown in Figs. 1, 4 and 5, and carries with it a web cut off knife 42 which may be extended above the shoe and into the path of the webs passing over the drum 22 for severing the webs.

The shoe 40 provides an upper curved surface that is designed to be operated with the web running over the surface. The arms 41 supporting the shoes are connected by a common shaft to a drive motor 39, Fig. 1 by which the shoe 40 may be positioned between its lowered inoperative position, as shown in outline form in Fig. 3 to its elevated operative position, including the cut off knife as shown in Figs. 4 and 5.

A spray bar in the form of a cross member 45 supports a plurality of adjustably positionable adhesives spray nozzles 46. The spray nozzles are connected to a source of adhesive and may be aligned so that primarily only the web segments are sprayed by adhesive for transfer to a new core.

A pair of support arms 50, 51, referred to herein as secondary arms, are pivotally mounted at the off running ends of the side frames 13 and 14. An encoder 50A is incorporated into the pivot support to read out the angular position of the support arms.

The secondary arms 50 and 51 have a number of functions. First, they

the secondary arm 50, 51 to pivot to the primary/secondary transfer position as diagrammatically illustrated at 110 in the position shown in Fig. 7. The core shaft may be pulled and recored, and a recored shaft may be returned for readiness to be placed in the primary arms 24 in the slot 28 and on the cams 29, according to core handling apparatus well known in the art.

Also, following regenerative braking by the support drum 52, where a percentage of support drum pressure may be added to the support drum to prevent slippage during braking, and preceding the off loading of the completed roll set 100, the carriage sub-assembly for the secondary support drum 52 is fully lowered to its lowered position, by relative movement of the plates 50, 51 on the tracks 55 of the secondary arms. This fully lowered position is illustrated in Fig. 7.

During the continued winding of the roll set 100A, the primary arms 24, 25 continue to rotate and slowly move the winding set to the +30° from the vertical position as defined. After the primary arms are in the 30° position, substantially as shown in Figs. 7 and 8, and the winding roll 100A reaches a specific diameter of say 18", the secondary or support arms are moved slowly back toward the primary drum 22 and are stopped by a proximity switch 120 on the ends of the arms, at the notch 80. During this time the secondary support drum 52 is brought into raised position in a speed mode. The proximity switch 120 indicates that the core shaft 20 is now in the notch, and the position substantially is shown in Fig. 8. At that time, the latch plate 84 is activated by the cylinders 80 to lock and secure the core shaft in the notch 80 of the secondary arms. The winding now progresses, as shown in Fig. 8, in which the building roll set is wound into the secondary drum while engagement by the nip roll 30 is maintained. The up position of the support drum, at 52, reduces the lift pressure in cylinders 59 to a counter balancing pressure applied by the cylinders 59 to the effect that the loading on the roll 100A is zero or negligible so the primary nip roll 30 loading is dominate.

In a preferred embodiment, in which 60 inch diameter rolls 100 are formed, the initial engagement of the secondary arms as described above and as illustrated in Fig. 8 may take place at about a minimum 18 inch diameter and winding then continues by continuing to drive the secondary drum 52 in the speed

secondary arms, in the slots 80, is accomplished by receiving the core shaft in the slots 80 at the outer support surfaces 20b.

The hand-off of the building rolls 100A from the primary to the secondary arms, accomplished in views 7 and 8, occurs at a time when the building rolls have achieved a sufficient diameter so that the core shaft may be released from the slot 28. This is a function of the design of the machine but typically may be a diameter of 18 inches or greater. The secondary arms 50, 51, following the off- loading of the first roll set 100, are moved into a receiving position as shown in Figs. 7 & 8 and the transfer is smoothly made by engaging the core shaft at the adjacent support surface 20b stopping secondary arms 50, 51 rotations by sensor 120, and closing the slots 80 with the cylinders 82 and slot retainers 84, that move in non-interfering and adjacent relation to the primary arms with counter balance pressure programming as a function of secondary arms 51, 52 position by sensor 50A provided to cylinders 63, 64.

Sequence of Operations

1. While winding set is between driven main winding drum 22 and driven support drum 52 and with driven primary arm nip roll 30 retracted, a new freshly cored shaft 20 is automatically loaded onto cams 32 around slot 28 in primary arms in the -30° from vertical centerline position.

2. Upon initiation of roll change sequence, the knife shoe 40 is indexed around drum, under web and stops in cut position on the other side of core.

3. The driven primary arm nip roll 30 lowers to cored shaft and goes into speed mode to speed up the new cores close to line speed. See Figure 4.

4. Spray adhesive applicator nozzles 46 are in close proximity to the respective web 102.

5. Primary arms 25, 25 move 5° to -25° position from vertical centerline and core shaft 20 lowers off cams 32 and onto web 102 and drum 22, straightening the natural deflection.

6. As primary arms moves to -20° position, adhesive sprays onto web and pastes down the tails on the slit wound rolls 100. See Figure 5.

toward the drum 22 and are stopped when a proximity switch 140 on the arm 50 senses it is close to the new winding shaft. See Figure 8. Switch 140 is shown in Figure 4.

19. The support arm latch 84 extends and closes an interlock which allows the support arm retraction under counterbalance pressure.

20. The support drum 52 raises as the support arms pivot toward the drum 22 in the speed mode under raise pressure and switches to balance pressure at, say, 24" diameter and the winding set winds into the balanced support drum.

21. As the rolls wind, a position sensor 50A on support arm's pivot is used to program the counterbalance pressure of the support arm by the cylinders 58, 59 to prevent excessive bending of the core shaft during the winding operation.

22. When the winding set reaches a 24" to 30" diameter, the driven primary arm nip roll 30 raises and the support drum 52 changes from balance to programmed support pressure and the drive changes from speed to SLAT mode.

23. After the primary arm nip roll 30 has fully raised and the drive stopped, the primary arms 24, 25 rotate back to the load position. See Figure 9.

24. The nip of the programmed support pressure is adjusted to control roll hardness. The proximity switch 130 on the support arm senses if the support drum is supplying excessive support pressure and lifting the winding set. If this switch senses the core shaft, the support drum pressure is slowly decreased until the rolls and core shaft lower away from the switch.

25. After step 15, a shaft puller automatically engages with the core shaft and bleeds out the inflation pressure.

26. The shaft 20 is then retracted from the wound set 100 by an automatic shaft puller.

27. The table 110 lowers the rolls to the roll platform (not shown) and tilts to eject the rolls on the platform.

28. New cut cores are either manually or automatically loaded onto the table.

29. After the table senses that new cores have been loaded, the

table raises to the shaft insertion position.

30. The shafts are automatically inserted and automatically inflated.

31. An overhead hoist then picks up the shaft and when the primary arms have rotated back to the load position, the shaft is automatically loaded back onto the cam 32 around the slot 28 in the primary arms.

32. The winder is now ready for the next automatic roll change after the programmed footage or diameter on the winding roll is reached.

While the method herein described, and the form of apparatus for carrying this method into effect, constitute preferred embodiments of this invention, it is to be understood that the invention is not limited to this precise method and form of apparatus, and that changes may be made in either without departing from the scope of the invention, which is defined in the appended claims.

What is claimed is:

-CLAIMS-

1. The method of continuously winding split webs onto individual cores carried on a common elongated core shaft into a corresponding plurality of large diameter rolls including transfer of the split webs, substantially at line speed, from fully wound rolls onto such cores, and the start up of winding on such cores while suppressing critical speed limitations due to core shaft deflection, comprising the steps of:

(a) placing the core shaft with cores thereon into surface contact with such split webs supported on a single winding drum and bringing said core shaft and cores thereon up to line speed,

(b) applying a driven nip roll to said cores substantially at line speed and simultaneously restraining the ends of said core shaft against movement lateral to a radius line from the axis of rotation of said drum through said core shaft and,

(c) while said core shaft is so restrained, severing the split webs at positions downstream of the region of contact of said cores with said webs by said drum and simultaneously transferring said webs onto corresponding cores on said core shaft,

(d) and continuing to wind said webs onto said cores while said core shaft is so laterally restrained and further restrained between said driven nip roll and drum and preventing core shaft deflections that would otherwise cause such critical speed limitations.

2. The method according to claim 1 in which core shaft and the cores thereon are brought substantially to web line speed by the driven nip roll prior to contact of the cores with the split webs on the winding drum.

3. The method according to claim 1 in which said restraining step includes securing the core shaft at its ends against lateral movement by capturing the ends of the core shaft in an elongated slot that extends in a direction generally radially of the axis of the drum and provides a pathway for the core shaft with loaded cores thereon to move as the building rolls on said drum increase in diameter.

4. The method according to claim 1 in which the winder has a movable secondary support drum that is movable into contact with building rolls on the cores and in spaced relation to the winding drum, further including the step of bringing the secondary drum into contact with such rolls when the rolls have attained a predetermined diameter while maintaining contact of said driven nip roll with said building rolls.

5. The method according to claim 4 in which the step of restraining said core shaft against lateral movement is terminated following engagement of the secondary drum with the building rolls.

6. The method according to claim 4 in which the nip roll is maintained in contact with the building rolls at least until the secondary drum has come into contact with the building rolls.

7. The method according to claim 1 in which the nip roll is driven at a speed mode prior to the cutting step and is switched to a speed limited adjustable torque mode following the transfer of the webs onto the cores of the core shaft.

8. The method according to claim 6 in which the pressure of the nip roll on the building rolls decreases with increasing diameters of the rolls.

9. The method according to claim 1 including the step of spraying an adhesive on the inside surface of the webs leading to the fully wound rolls immediately prior to said cutting step for simultaneously gluing the tail segments of